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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,147	01/08/2001	Cletus N. Welch	1582A1	4411

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PPG INDUSTRIES INC  
INTELLECTUAL PROPERTY DEPT  
ONE PPG PLACE  
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EXAMINER	
BISSETT, MELANIE D	
ART UNIT	PAPER NUMBER
1711	6

DATE MAILED: 08/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

mk-6

**Office Action Summary**

Application No.

09/755,147

Applicant(s)

WELCH ET AL.

Examiner

Melanie D. Bissett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2-3,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The patent applications cited on the applicant's Forms PTO-1449 have been considered but not initialed since they are not published documents.

### ***Summary of the Claims***

2. Claim 1 is drawn to an article comprising a substrate and a photochromic polyurethane coating having a specified hardness and swelling property, where the coating is prepared from components comprising a polycarbonate polyol having a molecular weight of 500-5000 g/mol, an isocyanate, and a photochromic compound. The coating also optionally comprises an additional organic polyol having a molecular weight of at least 500 g/mol and a catalyst. Claims 2-3 and 19 limit the article to comprise additional layers, claims 4-5 limit physical properties of the coating, claims 6-9 limit the polycarbonate polyol, claims 10-11 limit the optional polyol, claims 12-16 limit the isocyanate, claim 17 limits the photochromic compound, claim 18 limits the optional catalyst, and claims 20-25 limit the substrate. It is noted that, although claims 7-9 limit formula I of claim 6, claims 7-9 do not limit the polycarbonate polyol to a polyol fitting formula I. Thus, a reference teaching a polycarbonate of formula II would anticipate the limitations of claims 7-9, since the further limitation of formula I is irrelevant to the presence of formula II. Likewise, claims 10-11 and 18 do not limit the coating to contain an additional polyol or a catalyst.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 1 recites "molecular weight of at least 500-5,000 grams per mole", where it is unclear how the molecular weight is to be determined. Nikitin describes the most common determinations of molecular weight: number-average, weight-average, and Z-average. Since the different molecular weights are conventional in the polymer art, the recitation of "molecular weight" without further description renders the claims indefinite.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over PPG Industries, Inc. in view of Ammons. PPG (WO 98/37115) can be found on the applicant's Form PTO-1449.

8. PPG discloses photochromic polyurethane coatings having a Fischer microhardness of 50-150 N/mm<sup>2</sup>,  $\Delta OD$  of 0.15 after 30 seconds,  $\Delta OD$  of 0.28 after 8

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minutes, and a bleach rate of less than 50 seconds (p. 5 line 3-p. 6 line 4). The coatings are prepared by reacting an isocyanate with a hard-segment-producing polyol and a soft-segment-producing polyol (p. 12 lines 13-20) with an optional catalyst (p. 11 line 25-p. 12 line 7) in the presence of a photochromic compound (p. 23 lines 13-30). Preferred isocyanates include isophorone diisocyanate blocked with methyl ethyl ketoxime (p. 10 lines 22-32), and preferred photochromic compounds include those of the applicant's claim 17 (p. 23 lines 13-30).

9. The reference teaches the use of soft-segment-producing polyols including polyester or polyether polyols with molecular weights of 500-10,000 g/mol (p. 15 lines 1-3; p. 15 line 31-p. 16 line 1), also teaching the use of hard-segment-producing polyols including polyacrylic polyols with molecular weights of 500-50,000 g/mol (P. 13 lines 10-17; p. 20 lines 19-27). PPG suggests the use of copolymers of (meth)acrylic monomers with the ethylenically unsaturated monomers of the applicant's claim 11 for hard-segment-producing polyols (p. 21 lines 7-25). However, PPG does not suggest the use of polycarbonate polyols having the claimed molecular weight for forming the polyurethanes.

10. Ammons teaches polycarbonate urethane compositions having improved weathering resistance, UV stability, low crystallinity, and impact resistance over a wide temperature range (col. 2 lines 5-36), where the urethane compositions are produced by reacting a diisocyanate with a polycarbonate diol having a molecular weight of 500-5000 g/mol (col. 2 lines 64-68). To obtain the beneficial results of the invention, a mixture of linear and cycloaliphatic diols is employed in the formation of the polycarbonate diol

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(abstract). Ammons notes a conventional process for polycarbonate formation, where the aliphatic and cycloaliphatic diols are reacted with their respective bischloroformate derivatives (col. 3 lines 15-19). Since 1,6-hexanediol and 1,4-cyclohexane dimethanol are noted as preferred diols (col. 2 lines 59-63), the reference suggests the use of a respective bischloroformate derivative, hexanediol bis(chloroformate).

11. One of ordinary skill in the art would recognize that the aliphatic and cycloaliphatic character of the diols used to form the polycarbonate diols would yield a soft, flexible segment in the resulting polymer. Therefore, it is the examiner's position that it would have been *prima facie* obvious to use the polycarbonate diols of Ammons' teaching as soft-segment-producing diols in PPG's polyurethanes. It is also the examiner's position that, because of the similarity of the applicant's urethane compositions with those of the combined references, the coating resulting from PPG and Ammons would possess the applicant's claimed swell properties. Motivation for choosing the polycarbonate diols would have been to form polyurethane coatings having reduced crystallinity (i.e. lower haze and increased transparency) while also having improved impact resistance over wide temperature ranges and excellent weathering resistance.

12. Regarding the applicant's claimed primer and protective hardcoats, PPG notes the use of both primers and protective coatings, where the primer is applied between the substrate and urethane coating (p. 29 lines 1-3). The protective coatings applied to the urethane coatings include organosilane coatings (p. 29 lines 11-17). PPG also teaches the use of the applicant's claimed substrates (p. 27 lines 8-17), preferring

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thermoplastic polycarbonate substrates for use in optical materials. Ophthalmic lenses having refractive indices of 1.48-1.75 are noted (p. 33 lines 9-18).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie D. Bissett whose telephone number is (703) 308-6539. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (703) 308-2462. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read "Nathan M. Nutter". The signature is fluid and cursive, with the first name "Nathan" being more prominent than the last name "Nutter".

mdb  
August 8, 2002

**NATHAN M. NUTTER**  
**PRIMARY EXAMINER**  
GROUP ~~17~~ 11